

OM4000

Installation Manual



OM4000

INSTALLATION MANUAL





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OM4000

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GENERAL VIEW

OM4000

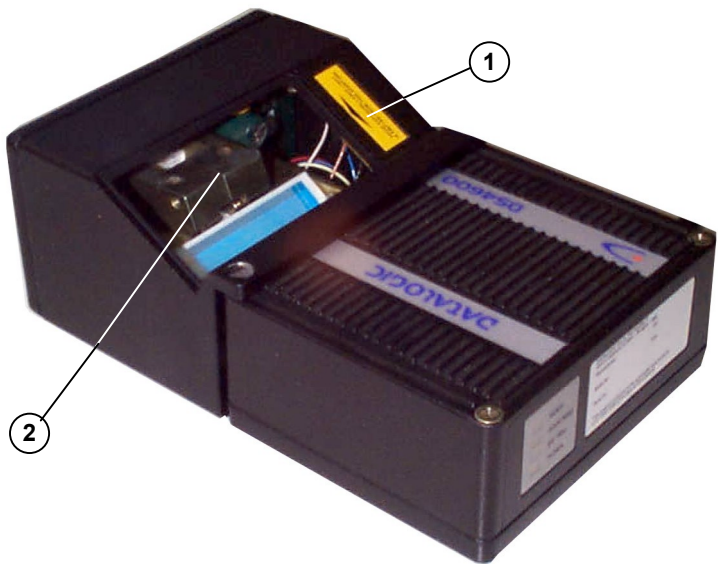


Figure A

- ① Warning Label
- ② Laser Beam Output Window

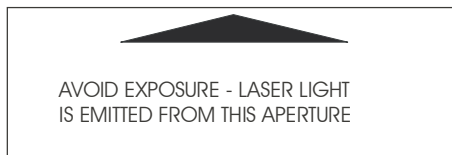
SAFETY PRECAUTIONS



WARNING

Once the scanner-oscillating mirror reading system is assembled, the laser beam is emitted from the output window of the OM4000. All the precautions regarding laser exposure must be taken, (details are given in the Installation Manual of the scanner).

The following label is applied near the output window of the OM4000.



Warning label

1 INTRODUCTION

The OM4000 oscillating mirror is an accessory for the 4000 series laser scanners: DS41, DS4300, DS4600. It is designed to generate homogeneous and adjustable raster reading through deflection of the scanning laser beam.

The system consists of the oscillating mirror attached to the scanner and allows a surface instead of a line to be observed; versatility and reading accuracy are therefore increased in "Picket Fence" reading mode.

Some examples are given in the following cases: codes presented at different "heights" on the reading surface; codes with printing defects.

The electronic and electromechanical components controlling the mirror movement are contained inside the rugged metal casing, which guarantees protection class IP64 when the OM4000 is mounted correctly onto the scanner.

The OM4000 can be easily powered from the C-Box of the scanner. It operates exclusively at low power, between 10 and 30 VDC.

Setup Mode

The Setup operating mode is a very useful tool designed to help the system installer to set the oscillating amplitude. In this mode the oscillating mirror switches alternating between the two extreme positions of the programmed oscillating amplitude. This allows an easy identification of the two extreme scan lines, even if in bright ambient light applications.

2 INSTALLATION

When opening the packaging, verify that the OM4000 oscillating mirror is complete with a set of fixture screws, sealing gasket, accessory cable with connectors, and this installation manual.

Check that the output window of the scanner is clean, otherwise clean with soft material and alcohol; all abrasive substances must be absolutely avoided as they cause irreparable damage to the transparency of the glass.

2.1 MECHANICAL DIMENSIONS

The following figure gives the overall dimensions of the OM4000 and may be used for its installation.

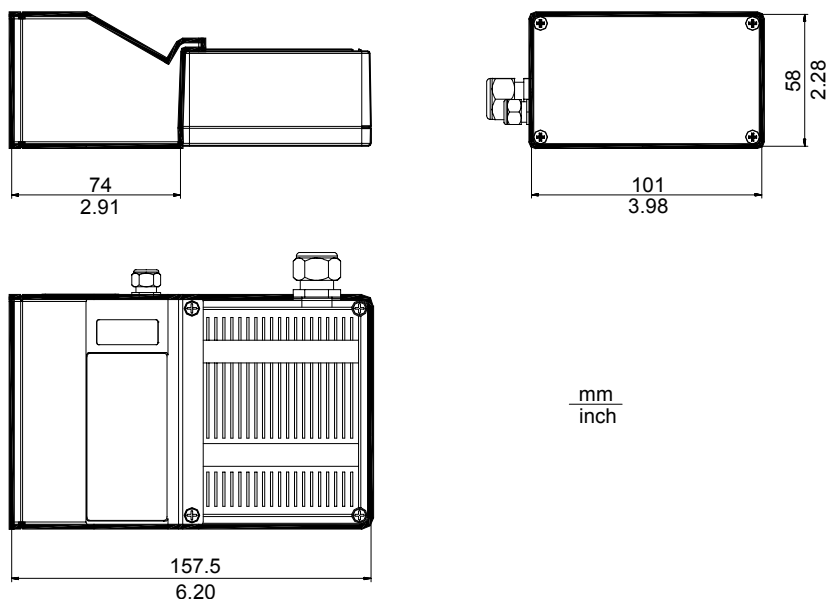


Figure 1 - Overall dimensions

2.2 ASSEMBLY TO THE SCANNER

- 1) Clean the mirror surface with a clean soft cloth and alcohol before assembling it to the scanner.

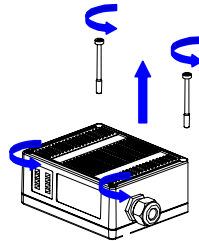


Figure 2

- 2) Loosen all four cover screws on the scanner removing the two cover screws from the scanner on the side closest to the Laser beam output window. See Figure 2.

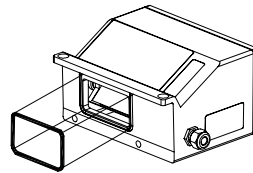


Figure 3

- 3) Press the sealing gasket into the seat on the OM4000 body. See Figure 3.

- 4) Align the OM4000 over the output window of the scanner and join the devices using the two long fixing screws supplied. Tighten all four screws (see Figure 4).

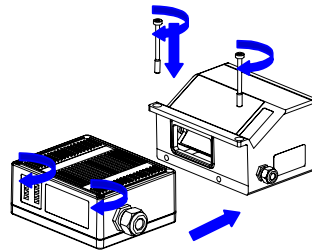


Figure 4

- 5) Turn the assembly over, insert and tighten the two short fixing screws (see Figure 5).

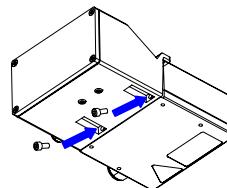


Figure 5

2.3 ELECTRICAL CONNECTION

The OM4000 has a four-wire cable that extends from the compression connector and allows connection to the C-Box of the scanner.

To facilitate quick connections for maintenance or replacement, the accessory connection cable with 9-pin female connector and corresponding 9-pin male connector can be wired between the C-Box and the OM4000.

The following signals must be connected:

Wire Color	Signal	Function
Red	VS	Power Supply +
Black	GND	Power Supply -
Yellow	EXT TRIG+	External Trigger input +
Brown	EXT TRIG-	External Trigger input -

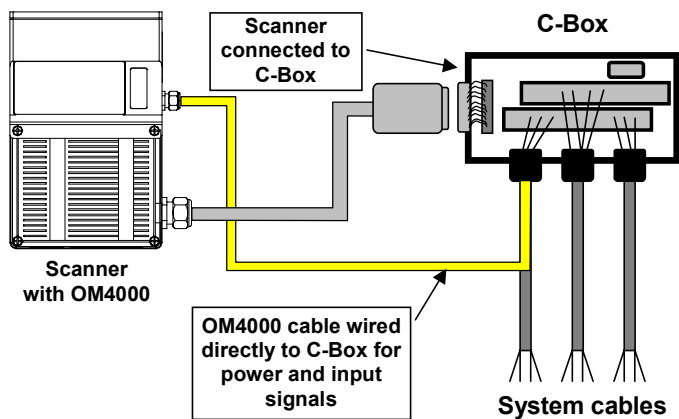


Figure 6 - Electrical connection to C-Box

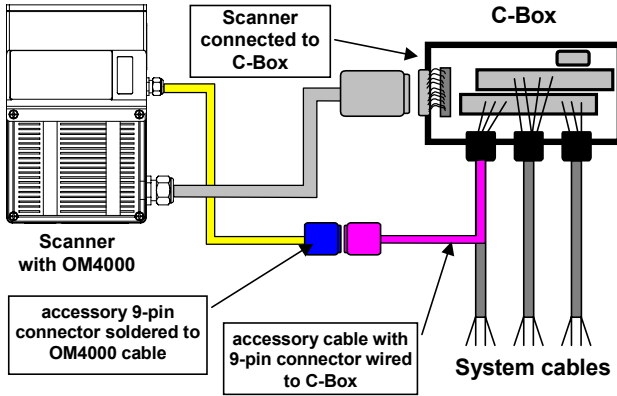


Figure 7 - Electrical connection to C-Box using accessory cable

2.4 READING FEATURES

The reading features of the 4000 series scanner with the OM4000 decrease in typical conditions due to the optical signal passing through the output window of the OM4000 and the reflection on the mirror surface.

The reading distance also depends on the aperture of oscillation used. In particular, wider apertures require the scanner to be closer to the code in order to read at the extreme edges of the sweep, see the figure below and also the reading diagrams in Appendix A.

The OM4000 reference angle 0° has a position tolerance of $\pm 3^\circ$ when mounted on different types of scanners (i.e. mounting to DS4600 with respect to DS41). In any case the maximum aperture is $\pm 20^\circ$ with respect to 0° .

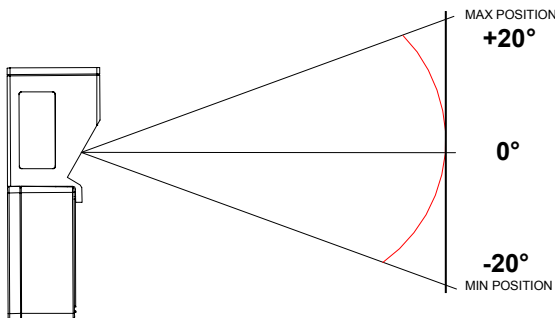


Figure 8 - OM4000 reading distance

2.5 ADJUSTMENT

The OM4000 can be configured to operate in different modes by setting hardware switches located inside the oscillating mirror body. See the figure below. To access these switches you must remove the four cover screws shown in the figure below.

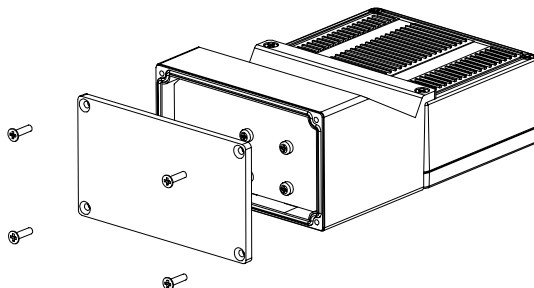


Figure 9 - Opening the OM4000 body for configuration

The following operating modes can be configured:

- **Oscillating** - mirror always oscillating (see par. 2.5.1).
- **Triggered** - mirror stopped after reading phase off (see par. 2.5.2).
- **Fixed** - mirror set to fixed angle (see par. 2.5.3).

The following table describes the allowable switch settings for OM4000 configuration.

Switches	Operating Modes		
	Oscillating	Triggered	Fixed
Mode	1	0	indifferent
Min Position	1-D	1-D	0
Max Position	3-F	3-F	1-F
Frequency	1-F	1-F	indifferent

Table 1 - Allowable switch settings

Combinations other than those specified in the table are erroneous and will cause the red ERROR LED to turn on.

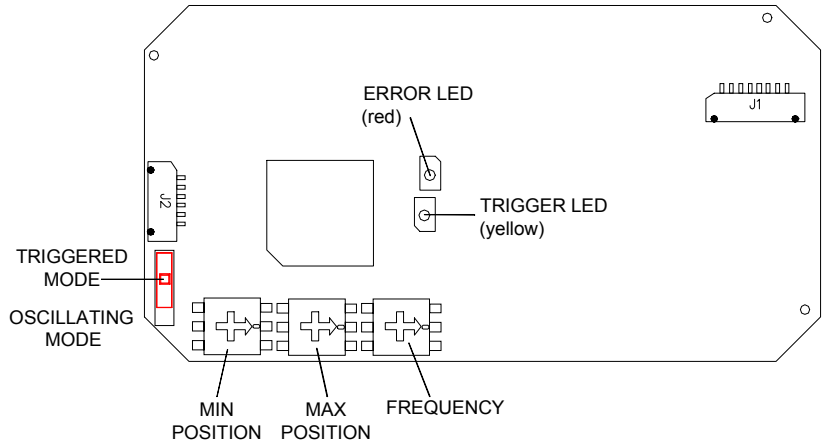


Figure 10 - Configuration switches

The raster width of the OM4000 is adjustable between +20° and -20° with reference to center 0° (see Figure 8). The raster width is factory set to **24°** (from +12° to -12°).

The oscillation frequency of the OM4000 mirror can be set between 0.5 and 20 Hz. The oscillating frequency is factory set to **10 Hz**.

Min and Max Position Switch Setting	Angle in °
1	-20
2	-18
3	-15
4	-12
5	-9
6	-6
7	-3
8	0
9	3
A	6
B	9
C	12
D	15
E	18
F	20

Table 2 - Raster width settings

Frequency Switch Setting	Frequency in Hz
1	0.5
2	0.6
3	0.75
4	0.85
5	1
6	1.5
7	2
8	2.5
9	3
A	4
B	5
C	7
D	10
E	14
F	20

Table 3 - Oscillating frequency setting

2.5.1 Oscillating Mode

In Oscillating mode, the mirror is in continuous movement between the Min and Max position settings. It requires only the power inputs VS and GND to be connected.

To use the OM4000 in this mode:

1. Set the **MODE** switch to **Oscillating** (default setting).
2. Set the **Frequency** switch to **0** (setup). The mirror will toggle between the Min and Max positions aiding the configuration.
3. Set the **Max Position** switch to the correct value for your application.
4. Set the **Min Position** switch to the correct value for your application.
5. Set the **Frequency** switch to the desired value for your application between 1-F (oscillating mode).

Example:

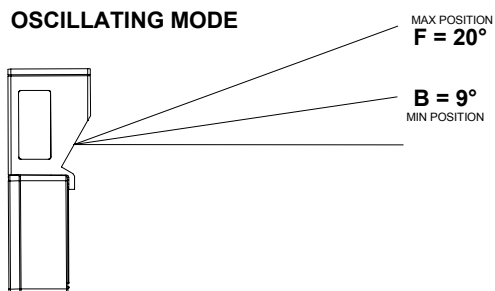


Figure 11 – Oscillating mode



NOTE

The Min Position value must be less than the Max Position (2 switch positions). The aperture limits in the following table also apply.

Hz	Max. Aperture	Extreme Angle Positions
0.5	40°	+ 20° - 20°
0.6		
0.75		
0.85		
1		
1.5		
2		
2.5		
3		
4		
5		
7		
10	30°	+ 18° - 18°
14	24°	
20	18°	



NOTE

By limiting the raster width to the minimum necessary, the number of scans on the reading surface is increased.

2.5.2 Triggered Mode

With this operating mode the oscillating mirror movement is stopped after the reading phase OFF signal (EXT TRIG becomes inactive) plus a fixed 5.3-second timeout. In low-throughput applications or applications with scheduled operating cycles, it is possible to extend the life of the oscillating mirror by limiting operation and therefore mechanical wear, to the specific time that barcodes are present in the reading area.

The mirror begins movement again at the reading phase ON signal (EXT TRIG becomes active).

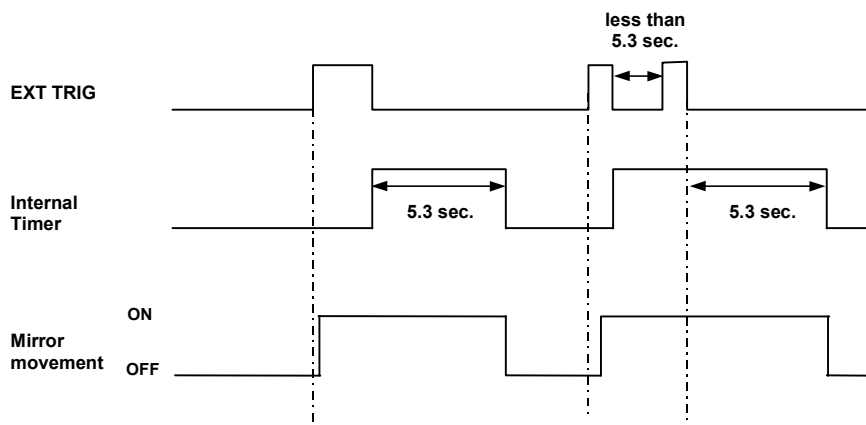


Figure 12 - State diagram for Triggered mode

The EXT TRIG+ and EXT TRIG- inputs must be connected as well as the power VS and GND.

To use the OM4000 in this mode:

1. Set the **MODE switch** to **Triggered**.
2. Set the **Frequency** switch to **0** (setup). The mirror will toggle between the Min and Max positions aiding the configuration.
3. Set the **Max Position** switch to the correct value for your application.
4. Set the **Min Position** switch to the correct value for your application.
5. Set the **Frequency** switch to the desired value for your application between 1-F (triggered mode).



NOTE

The Min Position value must be less than the Max Position (2 switch positions). The aperture limits in the following also apply.

Hz	Max. Aperture	Extreme Angle Positions
0.5	40°	+ 20° - 20°
0.6		
0.75		
0.85		
1		
1.5		
2		
2.5		
3		
4		
5		
7		
10	30°	+ 18° - 18°
14	24°	
20	18°	

This mode is further signaled by the yellow Trigger LED. The LED is on when oscillation is stopped. The LED is OFF when the mirror is oscillating.

2.5.3 Fixed Mode

Fixed mode allows you to position the laser beam at any angle between $+20^{\circ}$ and -20° with respect to the mounting position of the scanner.

To use the OM4000 in this mode:

1. Set the **Min Position** switch to **0**.
2. Set the **Max Position** switch to the correct value for your application between 1-F. (the laser will move to the value aiding the configuration)

The MODE and FREQUENCY switch settings are indifferent.

Example:

FIXED MODE

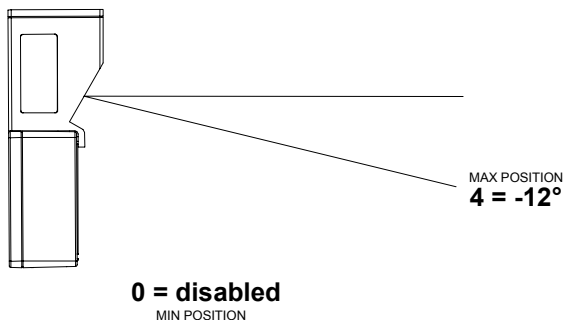


Figure 13 – Fixed mode

3 MAINTENANCE AND TROUBLESHOOTING

OM4000 has no user replaceable components and, apart from periodically cleaning the output window, no particular maintenance is necessary; dust and dirt on the surface may alter the reading performance of the system.

Clean the window with soft material and alcohol, absolutely avoiding all abrasive substances.

**WARNING**

Do not remain in the laser beam output zone during these procedures.

If the device does not operate correctly, verify the power supply is present and the raster width setting is correct.

If the red ERROR LED is on check the switch settings for correct operating mode configuration.

Integrate the operating controls of the scanner with the above.

Please consult your nearest Datalogic distributor if the problem persists after all the tests.

4 TECHNICAL FEATURES

ELECTRICAL CHARACTERISTICS	
Operating voltage	10 to 30 Vdc
Input current max	250 mA @ 10 Vdc
Power consumption max	3 W @ 30 Vdc
Raster width	user adjustable from 0° to 40° (for further details see paragraph 2.5)
Oscillation frequency	user adjustable from 0.5 Hz to 20 Hz (for further details see paragraph 2.5)
READING FEATURES	
See paragraph 2.4, Appendix A, and the scanner Installation manual	
ENVIRONMENTAL FEATURES	
Operating temperature	0° to +40 °C (+32° to +104 °F)
Storage temperature	-20° to +70 °C (-4° to +158 °F)
Max. relative humidity	90% non condensing
Vibration Resistance	IEC 68-2-6 Test FC 0.5 G @ 9 to 150 Hz; x, y, z axis for 2 hours
Shock resistance	IEC 68-2-27 Test EA 30 G; 11 ms; 3 shocks x, y, z axis
Protection class	IP64 (when correctly mounted to the scanner)
PHYSICAL FEATURES	
Mechanical dimensions	74 x 101 x 58 mm (2.9 x 4.0 x 2.3 in.)
Weight	approximately 650 g (23 oz)

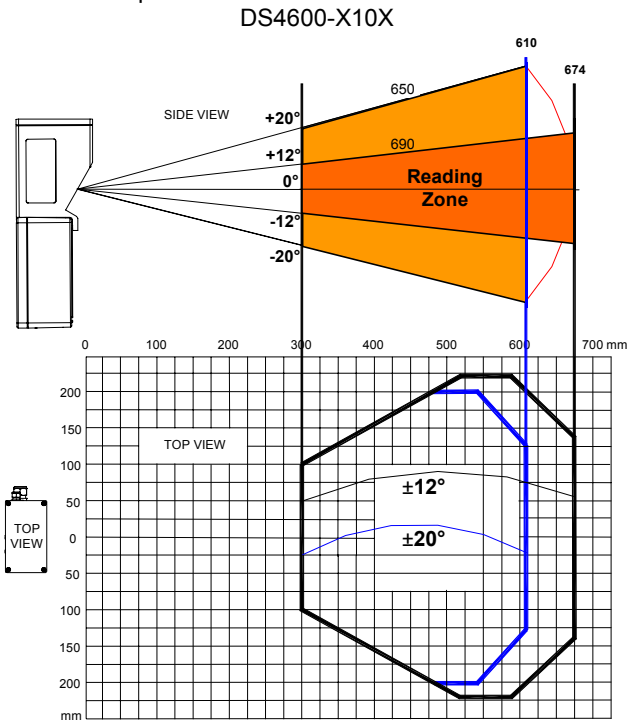
Note: the features indicated are to be considered typical at an ambient temperature of 25 °C (77 °F), if not specified differently.

A READING DIAGRAMS

A.1 EXAMPLE READING DIAGRAM

The following reading diagram is given as an example of performance that can be obtained in optimal conditions using a high grade printed barcode. It demonstrates the reading field in the case where the extreme ends of oscillation are set for $\pm 20^\circ$ or $\pm 12^\circ$.

You should verify your application specific reading conditions taking into account the factors listed in par. 2.4 and that the maximum reading distance is less at the extreme ends of the sweep.



Conditions:

Test Code:	=	2/5 Interleaved; 0.50 mm
Reading Mode	=	Linear
Code Resolution	=	Standard
Scanning Speed	=	Speed_3 (800 scans/s)
Code Reading Cond.	=	Standard